EDMS *Reference Manual* Supplement
- Model Changes Between EDMS 944B And EDMS 3.0 -

Aircraft

Change	Effect
EDMS 944B allowed the user to choose an airframe, but applied a default engine and corresponding emission factors. EDMS 3.0 allows the user to specify an airframe and engine combination.	The ability to specify an actual airframe and engine combination results in much greater resolution in defining aircraft emissions.
The default engine for any particular airframe in 944B was a combination of all possible engines for that airframe, and a straight average was taken of all possible engine emission factors. For example, the B727-200 airframe in 944B can be fitted with any one of the following engines: JT8D-15, JT8D-15A, JT8D-17, JT8D-17A, JT8D-17R, or JT8D-7. The composite pollutant emission factors used for the B727-200 in EDMS 944B were the average of emission factors for the above listed engines. In 3.0, the user specifies an airframe and engine combination. The engine is chosen from the list of possible engines for the airframe. For many airframes a default engine option also is available. The default engine (if available) in 3.0 is a specific engine that was found to hold the largest market share of all the possible engines. The list of aircraft default engine assignments is available on the EDMS Internet Site: http://aee.hq.faa.gov/aee-100/aee-120/edms. In the above B727-200 example, the JT8D-15 engine is the most common engine and hence is used as the default.	The default emission factors for an airframe in EDMS 3.0 will almost always be different than those for the same airframe in EDMS 944B because the default emission factors represent a specific engine rather than an average. Hence the emissions from identical airframes with default emissions will almost always be different between the two versions.
The emission factors used in EDMS 944B were derived from aircraft engine emission factors found in the FAA's Aircraft Engine Emission Database (FAEED). The engine emission factors used in EDMS 3.0 are derived primarily from the International Civil Aviation Organization's *Exhaust Emissions Data Bank* (First Edition 1995 plus addendum) and in part from FAEED, EPA's *Compilation of Air Pollutant Emission Factors* (EPA Report No. AP-42), and information supplied directly from engine manufacturers.	The aircraft engine emission factors in EDMS 3.0 represent the most up-to-date and accurate data available. In many cases this will result in emissions totals that are different from those that were generated using EDMS 944B. Certain aircraft will show decreases in emissions while others will show increases. These differences are expected and represent the availability of better data.

Aerospace Ground Equipment (AGE)

There have been no significant changes to AGE emission factors for military aircraft. However the list of available AGE has been expanded.

Ground Support Equipment (GSE)

Change	Effect
The GSE emission factors in EDMS 944B were based upon data from the 1982 version of the FAA's *Air Quality Procedures for Civilian Airports and Air Force Bases* handbook. In EDMS 3.0, emission factors for several GSE types are updated based on data from the 1992 California Air Resources Board (CARB) study *Regulatory Strategies For Off-Highway Equipment*. The CARB study focuses on the derivation of emission factors for several categories of off-road vehicles, one of which is ground support equipment. Of a total of 58 pieces of equipment in EDMS 944B, the emission factors for 20 GSE types changed in EDMS 3.0. For ten of the twenty GSE types, there is a significant increase in CO emission factors in the range of 50% to 1000%. For example, the Gasoline Baggage Tractor's CO emission factor changed from 1.798 Kg/Hr (EDMS 944B) to 13.198 Kg/Hr (EDMS 3.0) - an increase of 734%. The allocation and use of specific GSE types, however, has not changed.	For most commercial aircraft, four pieces of GSE are applied automatically to each aircraft as a default assignment: gasoline baggage tug, diesel belt loader, diesel fuel truck, and diesel aircraft tug. For each aircraft type with the default GSE assignment, the net change in pollutants per LTO cycle in EDMS 3.0 over EDMS 944B is as follows: CO = +45.34lbs, HC = -0.44lbs, NO_x = +0.71lbs, SO_x = +0.06lbs, PM-10 = -0.01lbs. As shown above, using the default assignment of GSE will result in little or no change in emissions for HC, NO_x, SO_x, and PM-10. However, carbon monoxide emissions will increase significantly in EDMS 3.0 using the default assignment of GSE. In some cases these values can be six to seven times greater than those obtained using EDMS 944B. These differences represent the availability of better data.

Vehicular Emissions

Change	Effect
The EDMS 944B database of vehicular emission factors contained 440 records. The EDMS 3.0 database of vehicular emission factors has been expanded to include over 14,000 records.	The significant expansion of the vehicular emissions database provides the user with much greater resolution in estimating vehicle emissions.
One important determinant of vehicle emissions performance is the mode of operation. Vehicle operating modes include cold start (i.e., operation of the vehicle at ambient temperatures and thus not performing at optimum levels), hot start (i.e., operation of the vehicle when it is not completely warmed up and not idle for enough time to cool down to ambient temperature), and stabilized (i.e., operation of a fully warmed-up vehicle). In EDMS 944B, the user was able to specify only the percent of vehicle miles traveled (VMT) while operating in cold start mode. However, according to EPA guidance this is not sufficient. The percent of VMT representing non-catalyst cold start, catalyst hot start, and catalyst cold start should be specified to sufficiently define the VMT. To better define VMT, EDMS 3.0 does not rely exclusively on a cold start specification but upon EPA suggested default values for non-catalyst cold start – 20.6%, a catalyst hot start – 27.3%, and a catalyst cold start – 20.6%.	Using EPA default values instead of specifying only the cold start percent will result in more accurate vehicle emission results. Emission results will most likely be different between EDMS 944B and EDMS 3.0 based upon the cold start percent that was specified in 944B.

Auxiliary Power Units (APUs)

There have been no significant changes to APU emission factors. However the list of available APUs has been expanded.

Stationary Sources

With the exception of "training fires", the stationary source data in EDMS 3.0 are identical to that in EDMS 944B and will generate almost identical results.

Training Fires

Change	Effect
EDMS 944B contains emission factors for only one fuel, JP-4. EDMS 3.0 contains emission factors for three fuels: Propane, JP-4, and JP-8.	The user is presented with an expanded list of aviation fuels that may be specified for training fires, which results in greater accuracy when computing emissions from training fires.
The emission factors for JP-4 have been updated in EDMS 3.0 based upon U.S. Air Force documents.	For JP-4 training fires, inventories will reflect the updated emission factors. The main differences between the original JP-4 emission factors and the updated factors are significant decreases in hydrocarbon and sulfur oxide emissions and a significant increase in particulate matter emissions.